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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MISLEH, JUSTIN P	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/400,549	NODA, HIROSHI	
	Examiner	Art Unit	
	Justin P. Misleh	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 10 and 19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 10 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 18 April 2005 has been entered.

Response to Arguments

2. Applicant's arguments with respect to Claims 1, 7, and 10 have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1 – 10 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. in view of Dhuse et al.

The following is summary of Sakai et al.:

In accordance with figures 1 and 2 and column 4 (line 29) – column 5 (line 49), Sakai et al. disclose an image processing apparatus that at least includes a shutter (2) and a photoelectric conversion unit (3) which includes a plurality of pixels. Furthermore, Sakai et al. disclose that when a user operates a release button, the shutter (2) is opened and the plurality of pixels of the photoelectric unit (3) captures an image of the subject that has passed through the lens (1) and the opened shutter (2). After the image of the subject has been captured, the shutter (2) is closed, such that light passing through the lens does not pass through the shutter (2) to the photoelectric conversion unit (3); hence, allowing the photoelectric conversion unit (3) to capture a dark image that represents noise. The noise capturing operation, while the shutter is closed, is repeated two or more arbitrary times such that a plurality of dark images are captured so that an averaged dark image can be calculated to represent the average noise of the photoelectric conversion unit (3). The averaged dark image is subtracted the subject image to produce a final image with reduced noise. Clearly, while the shutter is opened Sakai et al. captures a single subject image, at a particular time period, and while the shutter is closed Sakai et al. captures a plurality of noise images, at a plurality of particular time periods, respectively.

5. For **Claim 1**, Sakai et al. disclose, Sakai et al. disclose, as shown in figures 1 and 2 and as stated in column 4 (line 29) – column 5 (line 49), an image processing apparatus and a corresponding method, and a storage medium storing a program (inherent within the camera control circuit 10) comprising:

a photoelectric conversion unit (3) including a plurality of pixels; and

an operation unit (the entire circuit of figures 1 and 2) operating a correction value (averaged noise component; see column 4, lines 39 – 43) corresponding to noise component

("black data (noise data)") accumulated in the plurality of pixels (3) on the basis of a fist signal accumulated in the plurality of pixels and a second signal accumulated in the plurality of pixels (Sakai et al. teaches that the noise capturing operation, while the shutter is closed, is repeated two or more arbitrary times such that a plurality of dark images are captured so that an averaged dark image can be calculated to represent the average noise of the photoelectric conversion unit; hence, although not specifically labeled with "first" and "second" signals, such signals are present.),

wherein the first signal is the noise component accumulated in the plurality of pixels in a first time period and the second signal is the noise component accumulated in the plurality of pixels in a second time period different from the first time period (Clearly, while the shutter is opened Sakai et al. captures a single subject image, at a particular time period, and while the shutter is closed Sakai et al. captures a plurality of noise images, at a plurality of particular time periods, respectively.).

While Sakai et al. disclose that the noise component is comprised of a first signal and second signal accumulated during two different time periods in the plurality of pixels of the photoelectric conversion unit after capturing an image in the same photoelectric conversion unit, Sakai et al. does not disclose accumulating a noise component including a first noise signal and a second noise signal after a reset operation of the photoelectric conversion unit.

On the other hand, Dhuse et al. also disclose an image processing apparatus including a photoelectric conversion unit and an operation unit operating a correction value. More specifically, Dhuse et al. teach, as shown in figures 1, 5, and 6, an image processing apparatus (see figure 1) including a photoelectric conversion unit (see figure 5) and an operation unit (see

figure 1) operating a correction value (see Step 606 in figure 6) corresponding to a noise component. Dhuse et al. also teach, as clearly shown in figure 6, a first noise component signal accumulated in the photoelectric converter unit (Step 603 is a read-out step) until a first time period after the reset of the plurality of pixels (Step 601 is a reset step) and a second noise component signal accumulated in the photoelectric converter unit (Step 605 is also a read-out step) until a second time period after the reset of the plurality of pixels (Step 601 is the reset step). While the Examiner acknowledges that the second read-out corresponding Step 605 and the claimed second signal takes place after a second reset (Step 604) the second signal is still accumulated in a different time period that the first signal (Step 603) and both the first and second signals are accumulated after the reset of the plurality of pixels (Step 601), as claimed.

As stated in column 2 (lines 10 – 25), at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included accumulating the noise component including a first noise signal and a second noise signal after a reset operation of the photoelectric conversion unit, as taught by Dhuse et al., in the image processing apparatus including an operation unit, disclosed by Sakai et al., for the advantage of eliminating the addition of noise to the image signal by fluctuations in the power supply voltage.

6. For **Claim 7**, Sakai et al. disclose, as shown in figures 1 and 2 and as stated in column 4 (line 29) – column 5 (line 49), an image processing apparatus and a corresponding method, and a storage medium storing a program (inherent within the camera control circuit 10) comprising:

a photoelectric conversion unit (3) including a plurality of pixels;

storage device (memories 81 and 82) for storing noise information of each pixel of the plurality of pixels for noise information independent from an accumulation time and

accumulated in the plurality of pixels until a first time period (see explanation below) and noise information of each pixel of the plurality of pixels for noise dependent upon the accumulation time and accumulated in the plurality of pixels until a second time period different from the first time period (Clearly, while the shutter is opened Sakai et al. captures a single subject image, at a particular time period, and while the shutter is closed Sakai et al. captures a plurality of noise images, at a plurality of particular time periods, respectively.); and

an operation unit (the entire circuit of figures 1 and 2) operating a correction value (averaged noise component; see column 4, lines 39 – 43) corresponding to noise component ("black data (noise data)") accumulated in the plurality of pixels (3) on the basis of noise information independent from an accumulation time and noise information dependent from an accumulation time (Sakai et al. teaches that the noise capturing operation, while the shutter is closed, is repeated two or more arbitrary times such that a plurality of dark images are captured so that an averaged dark image can be calculated to represent the average noise of the photoelectric conversion unit; hence, although not specifically labeled with "first" and "second" signals, such signals are present.),

In the Examiner's interpretation, the claim language simply requires that there is a plurality of pixels and that each pixel within that plurality accumulate a plurality of signals during a plurality of different time periods, respectively, wherein the plurality of signals accumulated during the plurality of different time periods are used to correct for noise in each pixel of the plurality of pixels, respectively. The claim language is written broadly enough that it does not require that the noise correction be performed on a strictly pixel-by-pixel basis or any particular plurality of pixels. In other words, the claim language does require that ONLY the

plurality of signals accumulated by a particular pixel be the ONLY plurality of signals used to correct the noise in that particular pixel.

While Sakai et al. disclose that the noise component is comprised of a first signal and second signal accumulated during two different time periods in the plurality of pixels of the photoelectric conversion unit after capturing an image in the same photoelectric conversion unit, Sakai et al. does not disclose accumulating a noise component including a first noise signal and a second noise signal after a reset operation of the photoelectric conversion unit.

On the other hand, Dhuse et al. also disclose an image processing apparatus including a photoelectric conversion unit and an operation unit operating a correction value. More specifically, Dhuse et al. teach, as shown in figures 1, 5, and 6, an image processing apparatus (see figure 1) including a photoelectric conversion unit (see figure 5) and an operation unit (see figure 1) operating a correction value (see Step 606 in figure 6) corresponding to a noise component. Dhuse et al. also teach, as clearly shown in figure 6, a first noise component signal accumulated in the photoelectric converter unit (Step 603 is a read-out step) until a first time period after the reset of the plurality of pixels (Step 601 is a reset step) and a second noise component signal accumulated in the photoelectric converter unit (Step 605 is also a read-out step) until a second time period after the reset of the plurality of pixels (Step 601 is the reset step). While the Examiner acknowledges that the second read-out corresponding Step 605 and the claimed second signal takes place after a second reset (Step 604) the second signal is still accumulated in a different time period that the first signal (Step 603) and both the first and second signals are accumulated after the reset of the plurality of pixels (Step 601), as claimed.

As stated in column 2 (lines 10 – 25), at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included accumulating the noise component including a first noise signal and a second noise signal after a reset operation of the photoelectric conversion unit, as taught by Dhuse et al., in the image processing apparatus including an operation unit, disclosed by Sakai et al., for the advantage of eliminating the addition of noise to the image signal by fluctuations in the power supply voltage.

7. As for **Claim 2**, Sakai et al. disclose, wherein said noise correction device calculates noise correction information corresponding to a predetermined accumulation time (subject image time) by using the first and second signals (black data) accumulated during the plurality of different time periods, respectively, and corrects the noise in each of the plurality signals from each of the plurality of pixels by using a result of the calculation (The subject image always corrected).

8. As for **Claim 3**, Sakai et al. disclose an image processing apparatus according to Claim 1, further comprising storage means (memories 81 and 82) for storing a noise value.

9. As for **Claims 4 and 8**, while Sakai et al. do not disclose the physical details of the components of the image processing apparatus, it is inherent that the components are comprised of circuits to operate the camera. More specifically, while Sakai et al. disclose an accumulation time for the photoelectric conversion device, Sakai et al. is silent with regards to a counter or some other means for counting the accumulation time of the photoelectric conversion unit. However; it is inherent to Sakai et al. to have a counter, clocking means, or some other means to count the accumulation time of the photoelectric conversion unit, otherwise, it would be

impossible for Sakai et al. to disclose an image capturing process, much less an accumulation time for the unit.

10. As for **Claim 5**, Sakai et al. disclose an image processing apparatus according to Claim 1, wherein said noise correction means includes calculation means for calculating noise information dependent upon the accumulation time (see below for further information) and noise information independent from the accumulation time (see below for further information), in accordance with the noise information of the pixel obtained during two or more arbitrary different accumulation times.

The Examiner interprets the claim language in the following manner, the calculation of noise information wherein that calculation is both dependent upon the accumulation time and independent of the accumulation time. Sakai et al. disclose the calculation of noise information using the summing circuits (7 and 71), the memories (8, 81, and 82), the N-bit shift circuit (5), and the sign inversion circuit (6). Furthermore, Sakai et al. disclose the calculation of noise information that satisfies the requirements as interpreted by the Examiner. The calculation of noise information, in Sakai et al., is dependent upon accumulation time in the respect that the noise data captured by the solid-state image pickup element (3) is captured according to the operation mode of the camera and can either be long or short, as set forth in the above rejections. The calculation of noise information, in Sakai et al., is independent from accumulation time in the respect that the noise data captured by the solid-state image pickup element (3) is calculated into noise information by downshifting to the lower digits by an arbitrary number of bits (set by the camera control circuit 10) and it inverted to an opposite sign, also as set forth in the above

rejections. Furthermore, the output of the memory (8), or rather the image data, is subtracted by the noise data.

11. As for **Claims 6 and 9**, Sakai et al. disclose an image processing apparatus according to Claim 5, wherein said noise correction means calculates the difference (summing circuit 7) between a noise signal dependent upon the accumulation time in the signal output from the pixel and noise signal independent from the accumulation in the signal from the pixel.

12. As for **Claim 19**, Sakai et al. in view of Dhuse et al. disclose a noise component comprised of a first signal accumulated in a first time period after a reset and a second signal accumulated in a second time period different from the first time period also after the reset. The noise component in Sakai et al. is directed to a dark current component and the noise component in Dhuse et al. is directed to a fixed pattern noise component. Therefore, the combination teaches wherein the first signal is a signal relating to a fixed pattern noise component and the second is a signal relating to a dark current component.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. in view of Dhuse et al. in further view of Kiri et al.

15. For **Claim 10**, Sakai et al. disclose, Sakai et al. disclose, as shown in figures 1 and 2 and as stated in column 4 (line 29) – column 5 (line 49), an image processing apparatus and a corresponding method, and a storage medium storing a program (inherent within the camera control circuit 10) comprising:

a photoelectric conversion unit (3) including a plurality of pixels; and

an operation unit (the entire circuit of figures 1 and 2) operating a correction value (averaged noise component; see column 4, lines 39 – 43) corresponding to noise component ("black data (noise data)") accumulated in the plurality of pixels (3) on the basis of a fist signal accumulated in the plurality of pixels and a second signal accumulated in the plurality of pixels (Sakai et al. teaches that the noise capturing operation, while the shutter is closed, is repeated two or more arbitrary times such that a plurality of dark images are captured so that an averaged dark image can be calculated to represent the average noise of the photoelectric conversion unit; hence, although not specifically labeled with "first" and "second" signals, such signals are present.),

wherein the first signal is the noise component accumulated in the plurality of pixels in a first time period and the second signal is the noise component accumulated in the plurality of pixels in a second time period different from the first time period (Clearly, while the shutter is opened Sakai et al. captures a single subject image, at a particular time period, and while the shutter is closed Sakai et al. captures a plurality of noise images, at a plurality of particular time periods, respectively.).

While Sakai et al. disclose that the noise component is comprised of a first signal and second signal accumulated during two different time periods in the plurality of pixels of the

photoelectric conversion unit after capturing an image in the same photoelectric conversion unit, Sakai et al. does not disclose accumulating a noise component including a first noise signal and a second noise signal after a reset operation of the photoelectric conversion unit. Also, Sakai et al. do not disclose a distance measurement calculation means for performing a distance measurement calculation in accordance with a signal corrected by said noise correction means.

On the other hand, Dhuse et al. also disclose an image processing apparatus including a photoelectric conversion unit and an operation unit operating a correction value. More specifically, Dhuse et al. teach, as shown in figures 1, 5, and 6, an image processing apparatus (see figure 1) including a photoelectric conversion unit (see figure 5) and an operation unit (see figure 1) operating a correction value (see Step 606 in figure 6) corresponding to a noise component. Dhuse et al. also teach, as clearly shown in figure 6, a first noise component signal accumulated in the photoelectric converter unit (Step 603 is a read-out step) until a first time period after the reset of the plurality of pixels (Step 601 is a reset step) and a second noise component signal accumulated in the photoelectric converter unit (Step 605 is also a read-out step) until a second time period after the reset of the plurality of pixels (Step 601 is the reset step). While the Examiner acknowledges that the second read-out corresponding Step 605 and the claimed second signal takes place after a second reset (Step 604) the second signal is still accumulated in a different time period that the first signal (Step 603) and both the first and second signals are accumulated after the reset of the plurality of pixels (Step 601), as claimed.

As stated in column 2 (lines 10 – 25), at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included accumulating the noise component including a first noise signal and a second noise signal after a reset operation of the

photoelectric conversion unit, as taught by Dhuse et al., in the image processing apparatus including an operation unit, disclosed by Sakai et al., for the advantage of eliminating the addition of noise to the image signal by fluctuations in the power supply voltage.

Additionally, on the other hand, Kiri et al. also disclose a digital electronic camera including an image processing apparatus. As shown in figure 2, the image processing apparatus of Kiri et al. includes an automatic focusing apparatus (30) with a distance measurement calculation means (34) for performing a distance measurement calculation.

As stated in column 1 (lines 66 and 67) and 2 (lines 1 – 3), at the time the invention was made, one with ordinary skill in the art would have been motivated to include the distance measurement calculation means (34) for performing a distance measurement calculation, as taught by Kiri et al., in accordance with a signal corrected by the noise correction means, of Sakai et al., so as to "provide an object detection mechanism in an imaging device with automatic focusing wherein the mechanism is capable of reliably detecting an object to be focused with a simple structure." Therefore, at the time the invention was made, it would have been obvious to one with ordinary skill in the art include the distance measurement calculation means (34) for performing a distance measurement calculation, as taught by Kiri et al., in accordance with a signal corrected by the noise correction means, of Sakai et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 571.272.7313. The

Examiner can normally be reached on Monday through Thursday from 7:30 AM to 5:00 PM and on alternating Fridays from 8:00 AM to 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wendy R Garber can be reached on 571.272.7308. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
June 26, 2005

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